The Land of Lincoln Block: Brick-making in Corning, Ohio

By

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“And some bricks are nameless, I know,”

The Winter Walks in Athens, Ohio **by Hollis Summers**

Contents

Introduction

The history of brick-making in Ohio seems to be largely the province of brick collectors, a relatively small but somewhat monomaniacal group of enthusiasts, and as will happen with interests that involve intensive collecting, the collecting often takes over. Few in my admittedly casual experience have shown the keen interest in the history of these objects that I saw displayed by the late William J. Belhorn and Arthur J. Allen. More recently, Don Dzuro's catalog of Ohio marked bricks (Dzuro 2008) documents not only the extent of brick manufacture in Ohio but also the manner in which the hobby of brick collecting can become an obsession. It will remain an important compendium on Ohio brick for many years to come but conveys little of the history of either individual companies or the industry as a whole.

As indicated, my interest in brick collecting has remained quite casual. Happening across them, I would pick up what I considered unusual "named" bricks, the collecting parameters usually being defined by the weight of the brick and the distance to the car. Sometimes, brick-related sites would be encountered during my archaeological CRM work, and this increased my interest in the topic (Murphy 1995, 1997). At some point in my archaeological peregrinations in southeastern Ohio, I stumbled across a paving brick impressed "LINCOLN," piquing my curiosity; but finding no Ohio listing for this name in Gurcke (1987), my interest subsided sufficiently to let me give away my sole Lincoln brick to an old acquaintance who wanted to present it to her boy friend, who happened to be named Lincoln. (Why, I've since wondered, could he not have been named

Hallwood or Carlyle?) In any case, I had to admit to my friend that I had no idea where the Lincoln brick was made nor even where I had found it.

The Lincoln Paving Block Company

McCollam (1976: 251-252) provides one of the few recent references to the Lincoln Paving Block Company, but his brief account contains a number of surmises and errors. The company was incorporated in 1914 with Grover O. French as president; son Garret [actually, *Garnet*] B. French, vice-president and treasurer; and F. S. Mulford, secretary. The office was in Room 601 of the City National Bank Building in Canton. The company was capitalized at $200,000.

No location for the plant was listed, as is often the case with articles of incorporation, but from this McCollam seems to have

mistakenly concluded that there was no actual plant. “Apparently… [the company] was a sales outlet for the Big Four Clay Company,” he inferred. Grover O. French had been secretary of the Big Four Clay Co., which had been chartered in 1902 and incorporated in 1908. Dr. W. A. White was president of that company, which built a brick and tile plant at Malvern that reached a capacity of one million brick per day (McCollam 1975: 251). According to McCollam again, the Big Four company closed its Malvern plant in 1917 but Lincoln Paving Block continued in business for two more years, “probably to sell off the re-

maining brick inventory at the Malvern plant," closing its Canton office about 1919.

Pursuing the Frenches a little further, McCollam notes that Garrett [i.e., Garnet] B. French was general manager of the Big Four Fireproofing Co., organized in 1918 and described in Canton City directories as "exclusive distributors for the products of the Big Four Clay Company," products such as backup and partition tile and hollow brick. McCollam assumes that since the Big Four plant had closed in 1917, the purpose of the new company was simply to dispose of inventory other than brick, which may well be the case. Big Four Fireproofing also closed its office in 1919.

The following year the French father and son team incorporated the Consolidated Clay Products Co., with Grover as

president, with "Garrett" as vice-president, and Dr. White as secretary. Capitalization was no less than $3,000,000. McCollam concludes that having liquidated the inventory at the Big Four's Malvern plant by this time the Frenches then formed Consolidated Clay Products to act as sales agents for other clay product producers, though there is no indication of which companies these producers might have been. Consolidated Clay Products was also short-lived. Bruce Z. Healy, a Cleveland stockholder, filed suit in Cuyahoga common pleas court in early 1923, alleging the company was insolvent and asking for appointment of a receiver. The plant was described as a $3,000,000 concern with a plant at Malvern. Healy charged G. O. and G. B. French with "a number of irregularities," including a refusal to allow him to examine the financial records of the company (*The Clay-Worker* 79(7): 677). Grover O. French

resigned soon thereafter and Frank Snyder of Massillon became president (*The Clay Worker* (80(3): 287). In April, 1924, the Malvern plant was busy making hollow tile and operating at capacity but there is no mention of the Corning brick plant (*The Clay-Worker* 81(5): 477). By 1925 all of the original officers of the company had been replaced, with none of the new officers appearing to have any experience with clay products. Stout (1928) does not list Consolidated (or Lincoln) anyplace. By 1930 the Consolidated company was in receivership (McCollam (1976: 252), the process no doubt helped along by a 1923 fire that caused a $20,000 loss to "the plant of the Consolidated Clay Products Co., at Corning, O." (Mansfield *News*, November 4, 1923. Several buildings and kilns were badly damaged. This could only be the Lincoln Paving Brick Co., but it remains unknown whether the plant was in operation at the time or, for that matter,

whether it ever operated again. It very possible the plant was repaired, for it is described as being in excellent condition when the receivers, E. A. McCuskey and C. W. Naas, offered it for sale (Portsmouth *Daily Times*, April 24, May 8, 1928).

Grover O. French
(from Lehman 1916)

McCollam may be correct that the activities of Consolidated Clay Products were confined to sales, but he certainly is wrong about the Lincoln Paving Block Company—the marked bricks prove that. But where was the plant located? Gurcke (1987) does not even list it, although he is the first to admit that his extensive list of brick brand names is not complete. As Dzuro (2008: 3) bluntly puts it: "Someone Must Have Made Bricks For Lincoln." According to him, Art Allen suggested that they may have been made at San Toy, an old coal-mining boom town in the northeastern corner of Perry County. Allen, it turns out, was pretty close but not quite on the mark.

The long-standing mystery among brick collectors (and shared by me) is solved by a brief note in *Brick and Clay Record* (June 1, 1915) reporting that the Lincoln Paving Block Co., a new concern in Canton, was opening a new plant at Corning. Grover

O. French was president, G. B. French vice president and treasurer, F. B. Milford [*sic*] secretary, and W. S. Cunnngham sales manager. It was also noted that the Frenches were associated with the Big Four Clay Co.

Further, the discovery of an elaborate booklet providing a photographic account of the construction of a Haigh continuous kiln at Corning, Ohio, in 1914 provides abundant documentation (American Clay Machinery Co. 1915), containing photos that in fact were used for years in advertisements by the company without identifying them as the Lincoln plant. And finally, the Sanborn Fire Insurance maps available for Corning (1916) locate the Lincoln Paving Brick works one-half mile northwest of the Corning fire station, with a capacity of 40,000 bricks daily.

Some of the early history of the company can be documented by several brief news items appearing in *Brick and Clay Record.* According to the issue of February 7, 1914, Cleveland capitalists had completed a deal whereby the Corning brick plant at *Glouster* was going to be put in operation. Property was being acquired, including the 120 acre farm of the late Nelson Rodgers, which would provide an abundance of material. A stock company had been organized to start the plant several years previously but lack of finances and some company trouble put a damper on the project and the plant was never started. In the March 7, 1914, issue, rumor had it that *Cleveland* capitalists would soon close a deal to purchase land of late Nelson Rogers near Corning and take over the brick plant of the Corning Clay Manufacturing Co.

Actually, the Corning Clay Manufacturing Co. was organized in 1907, with

$40,000 capital, by M. E. Joyce, James Jenkins, S. Eichebaum, W. H. Curran, C. B. Holcomb and others (*Brick* 27 (2), August 1907). Of these, Miles E. Joyce has been identified as a grocer, Jenkins as an operator in crude oil, Samuel Eichenbaum a proprietor of a dry goods store, Curran as a hardware merchant, and Calvin B. Holcomb a physician, all residents of Corning. According to *Brick and Clay Record* (December 15, 1909) the plant was about finished and would be one of the best equipped plants in the state. The Corning Clay Manufacturing Co. is also listed in a 1913 clay products directory as manufacturing common brick (Logden 1913:47), which documents that the earlier plant indeed started and operated for a number of years. There are no known examples of brick marked "Corning," and presumably this product was never marked or branded. A rare photograph in *The Little Cities Archive* may actually depict

the earlier pottery, for it appears to have been taken before construction of the elaborate Haigh tunnel kiln in 1914.

There happens to be a biographical sketch of G. O. French (Lehman 1916: 632) that not only describes Canton as "the home office for

Corning Brick Plant Undated Photograph
(Courtesy The Little Cities Archive LCPH-389)

two of the largest paving brick companies operating in Northern Ohio, the Lincoln Paving Block Company and the Big Four Clay Company" but notes that G. O. French is president of the former and secretary, treasurer and general manager of the latter. French was born in Hancock County, of Scotch and Irish ancestry, graduated from Fostoria Academy in 1883 and taught school, serving as superintendent of schools in Putnam County for four years. He bought 150 acres of undeveloped clay land in Stark County and established the Big Four Clay Company at Malvern in 1902. According to *Brick and Clay Record* (January 1904), building the plant was delayed because the railroad was very slow in getting the siding laid. But by this time the buildings had been completed and machinery was arriving.

The Big Four company operated a twenty kiln plant, with a daily capacity of 75,000 paving bricks, marketed through-

out Ohio as well as Pennsylvania, Indiana, Michigan and other states. It was capitalized at $200,000, and officers in 1915 were: W. A. White, president; G. B. French, vice president; G. O. French, secretary, treasurer and general manager (Lehman 1916: 632-633). William A. White was superintendent of a Cleveland electrical company, according to the 1910 federal census.

In 1914 French expanded his brick manufacturing by organizing the Lincoln Paving Brick Company, incorporated in that year with a capitalization of $200,000, and the following officers: Grover O. French, president and general manager; G. B. French, vice president and treasurer; and F. B. Mulford, secretary. Mulford was born in New Jersey but worked for several years in Canton before serving in World War I. It appears that by the time he was mustered

out the Lincoln Paving Brick Co. may have been defunct, and he settled in Philadelphia, where he was a collection agent for a bond company.

According to *Brick and Clay Record* (March 19 1914), business men of Corning were raising a bonus of $20,000 for the Lincoln Paving Brick Co., on condition that it will increase output to 75,000 daily. Increased capacity, it is claimed, will require $20,000 for new equipment. The drive must have been successful, for Lehman (1916) describes the plant of this company as located at Corning, Perry County, Ohio, where they have one continuous kiln 460 feet long, with a daily capacity of 75,000 brick. (The 1916 Sanborn map estimates 40,000 brick daily, which is probably more accurate.) Lehman continues: This plant, too, is exclusively devoted to paving brick, and is equipped with the most modern machinery

to be found anywhere. His success in organizing and developing these two companies has naturally given Mr. French much prominence in clay products circles in Ohio. He is now president of the Ohio Paving Brick Manufacturers' Association, which is composed of practically all the paving brick manufacturers in the state. The association was organized in 1915. Mrs. French, before her marriage, was Clara Adrain [i.e., Adrian], born in Putnam County, Ohio, daughter of Garnet B. Adrian, M. D. To the marriage were born two children: Garnet B., at the time vice president of the Lincoln Paving Brick Company; and Gale [usually *Gayle*] M., a high school student at the time. Son Garnet B. French was born ca. 1889 and in 1920 was still living in Canton and managing a clay products company that unfortunately is not named but presumably was the Consolidated plant at Malvern.

The Haigh Tunnel Kiln

Hervey Haigh was born in Huddersfield, Yorkshire, England in 1862, emigrating in 1890. In 1891 he married Susie Sykes Beaumont at Huddersfield but by 1894 they were living in Catskill, New York, where he became superintendent of the Catskill Shale Brick and Paving Co., the president of which was none other than Raymond C. Penfield (1860-1932), already ensconced in New York City. The brick works began operation in 1894 and so Haigh would seem to be have been involved with it from the beginning. In 1897 (*Brick* (6(2): 76) he was "improving" a continuous kiln at Galesburg, Illinois and by 1902 (*Brick* 16(2):30), he was advertising his own continous kiln, although by the time the Catskill brick works ceased operations in 1914 he had returned to England.

Penfield, who directly or indirectly was to play an important role in Haigh's career as well as that of his brother Lambert Haigh, was the

"Son" in J. W. Penfield & Son, a Willoughby, Oho, company begun by his father to manufacture clay-working machinery. This would become the American Clay Working Machinery Co. in


Raymond C. Penfield, New York, N. Y.

R. C. Penfield (*Clay-Worker*, 1922)

1896, just a year before the elder Penfield's death (Kingsley 1981: 75). J. W. Penfield died before his son, who was described as

"an unusually good promoter and business organizer," greatly overextended his business interests, more-or-less robbing Peter to pay Paul and forcing the American Clay Machinery Co. and five other companies into receivership (*New York Times* 1903, 1903a). By early 1905, however, the company had been reorganized as the American Clay Machinery Co., the creditors' committee asked Penfield to take charge of the reorganized company, and he was elected vice-president and manager, "in itself the strongest personal indorsement Mr. Penfield could receive" (*Brick* 22(4): 219).

Apparently it was about this time that Penfield acquired the rights to the Haigh tunnel kiln, although the precise date is not known. The 1904 catalog for the American Clay-Working Machine Co. advertises only the Bucyrus Steam Tunnel Dryer and the

Waste Heat dryer, with no mention of the Haigh kiln. Remarks appearing in *Brick and Clay Record* (26(3): 147) for March, 1907, indicate Haigh was still located in Catskill, New York, and independent. Likewise, in December, 1910, H*a*rvey Haigh of Catskill was constructing his fourth continuous kiln for the National Fireproofing Co. in New Jersey. Be that as it may, Hervey, Susie, and daughter Gertrude sailed for Liverpool on the Cunard liner *Mauretania* (second class) in June, 1910, and again in May, 1912. Except for a brief solo trip back to the United States Hervey made in 1913, it is believed that the family spent the remainder of their lives in England (UK National Archives, *Incoming Passenger Lists, Liverpool, June 26, 1910; May 28, 1912*).

It is especially interesting that Hervey Haigh lectured on his kiln system "at all hours of the day and night" and illustrated the lectures with "live-wire photographs of

recent installations" and reported a brisk business. The next year, at the 1908 Columbus convention of the National Brick Manufacturers' Association, Lambert Haigh spoke on "Electricity as a Power for Clayworkers," and it was also reported that Hervey and Lambert Haigh canvassed the convention in a most thorough manner, "with a view of planting a Haigh continuous kiln in the greatest number of places in the shortest possible time (*Brick and Clay Record* 26(3): 47, 28(2): 112, 118). (The Haigh system used electric rail cars to load and unload brick from the kiln, but the brick still had to be stacked manually once in the kiln.) Later in the year, *Brick and Clay Record* (29(6): 522) provided a photo of a Haigh kiln in Jacksonville, Florida, along with a testimonial, noting the largest kiln of this type was being built at the Bessemer Limestone Co. plant near Youngstown, to have a capacity of 200,000 paving brick a day. In May, 1910, *Brick and Clay Record*

(32(5): 243-244) attested that H. Haigh, the well known brickworks engineer had long been prominent as a builder of kilns and in the last few years the Haigh "semi-continuous" kiln had become one of the most popular forms of kiln construction. The journal specifically mentioned the expansion of the Bessemer, Pennsylvania, kiln being extended from 68 to 110 chambers in length, making it 650 feet long.

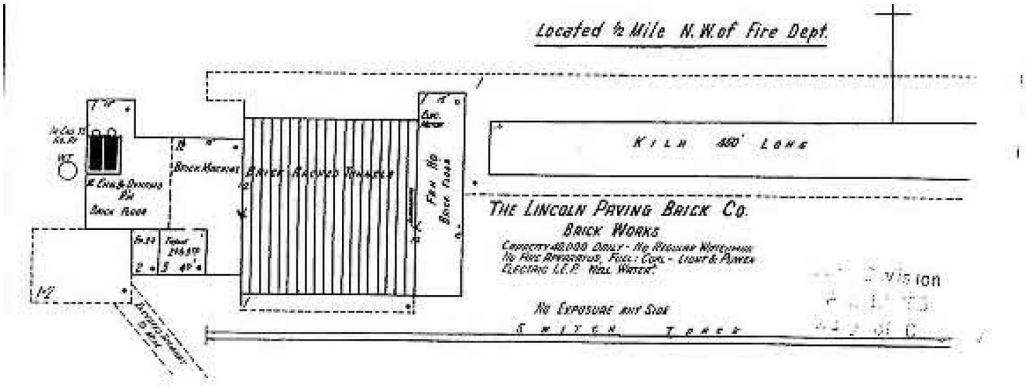
References to the Haigh kiln describe it variously as a semi-continuous or as a continuous tunnel kiln, "continuous" referring to the ability to fire continuously from one chamber to the next, so that theoretically firing could continue *ad infinitum*, barring various accidents and repairs or vagaries of production scheduling. Haigh's model essentially was what is known as a Hoffmann kiln, although

these are usually circular in pattern rather than linear. One advantage, if not the only advantage of Haigh's plan is that additional chambers could be added as needed. Otherwise, there seems to be no real distinction, perhaps the reason that Haigh seems never to have patented his kiln, neither in the United States nor in England.

The defining feature of both the Haigh and the earlier Hoffmann kiln is the fact that the fire is transferred from one chamber to another and as the fire passes around or through the kiln, the chambers immediately in front of the fire are gradually heated, as the chambers behind the fire gradually cool down. Loading and unloading of brick can take place more or less simultaneously, and different types of clay products might be fired more or less simultaneously, although scheduling clearly is a critical factor; but in any case the bricks remain stationary during the firing— it is the *fire* that moves through

the kiln. In today's parlance, "continuous kiln" more usually refers to a multi-chambered kiln or even more often a single-chambered kiln in which the bricks are moved through the kiln on cars. In fact, early on these were termed "railroad kilns," to distinguish them from continuous kilns in which the brick being fired remained stationary once set in the kiln. The Haigh kiln also included both side and top firing, resulting in greater control of the heat.

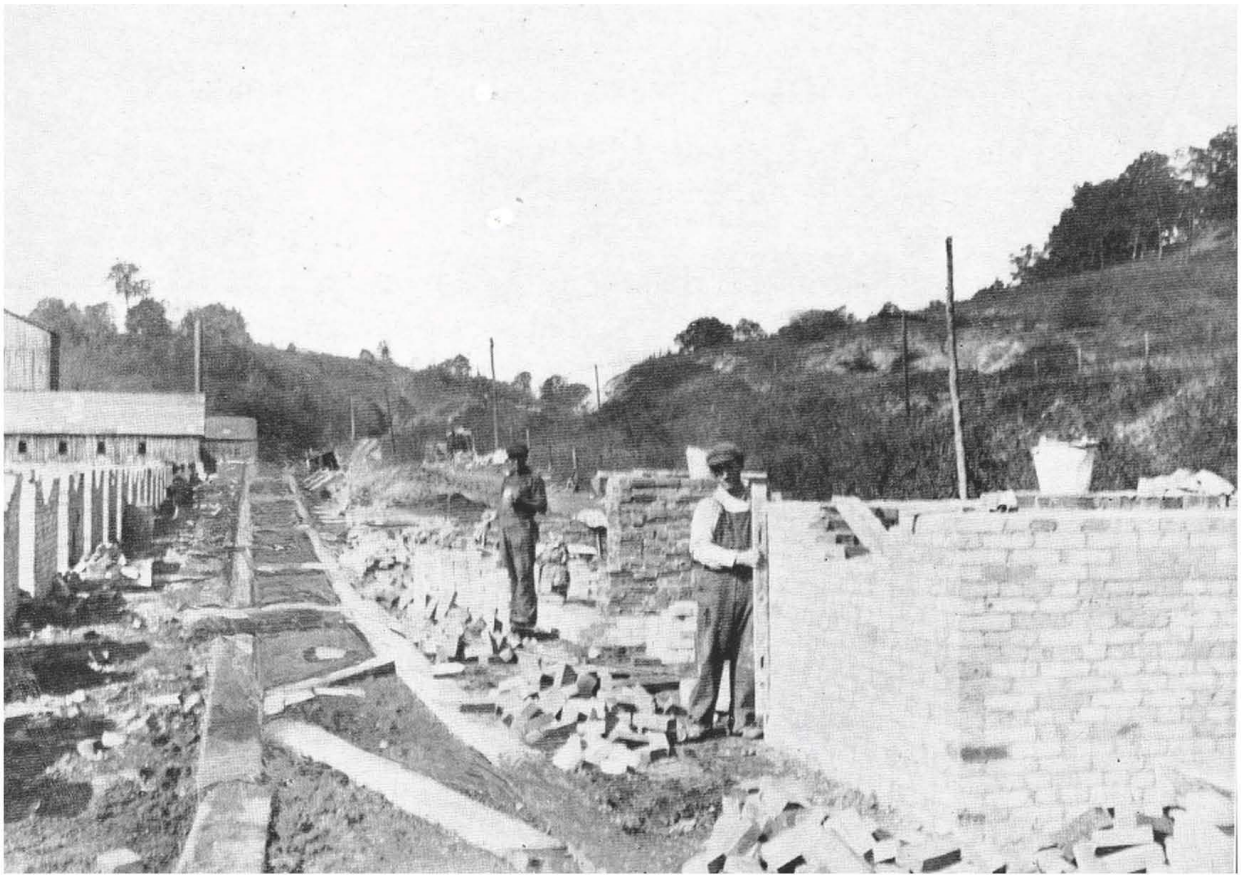
The interest in photography shown by the Haigh brothers was shared by the American Clay Machinery Co. and resulted in an elaborate pamphlet the company issued to describe the Haigh Kiln. Most of the illustrations in this catalog are shown below in chronologic order of the kiln construction. All are of the installation of the Lincoln Paving Block Co. plant at Corning. Comments below the captions derive largely from the pamphlet.



Sanborn Fire Insurance Map, 1916

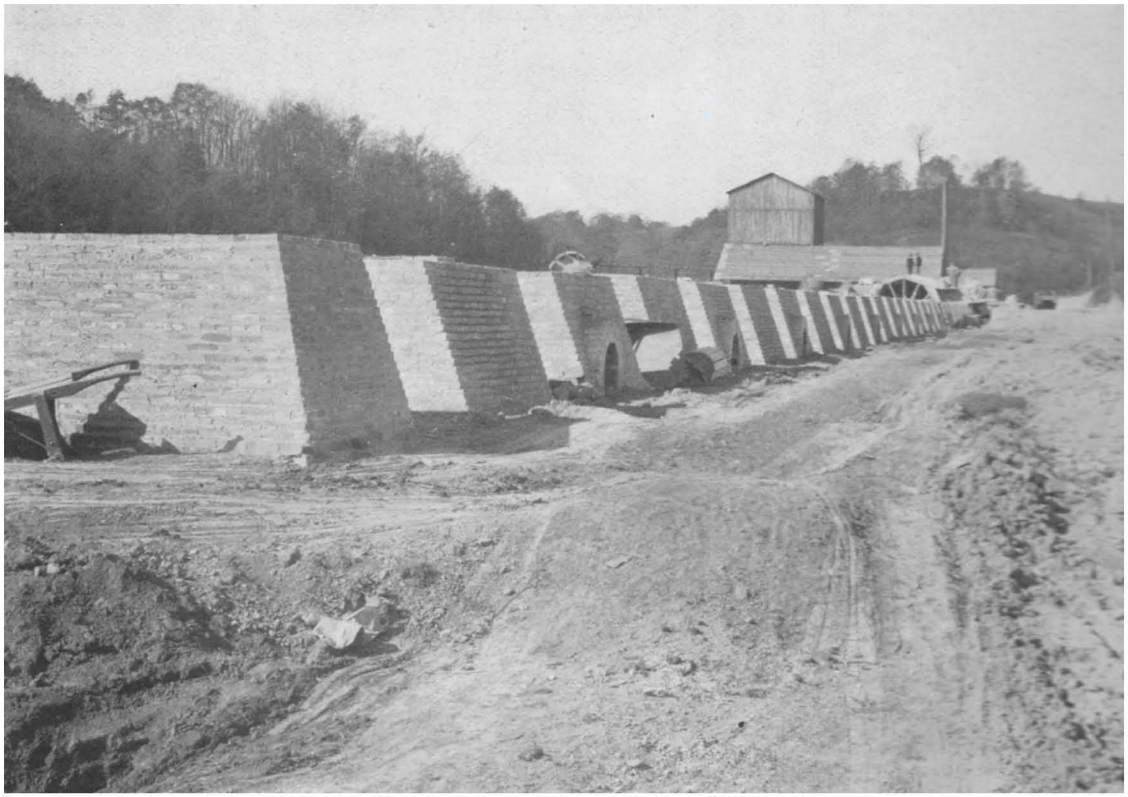
October 20, 1914

Initial Construction Looking Northwest



October 27, 1914

One of the piers constructed to support the main crown is shown at the lower right. Each of the 72 piers required 4300 common brick and 600 fire brick.



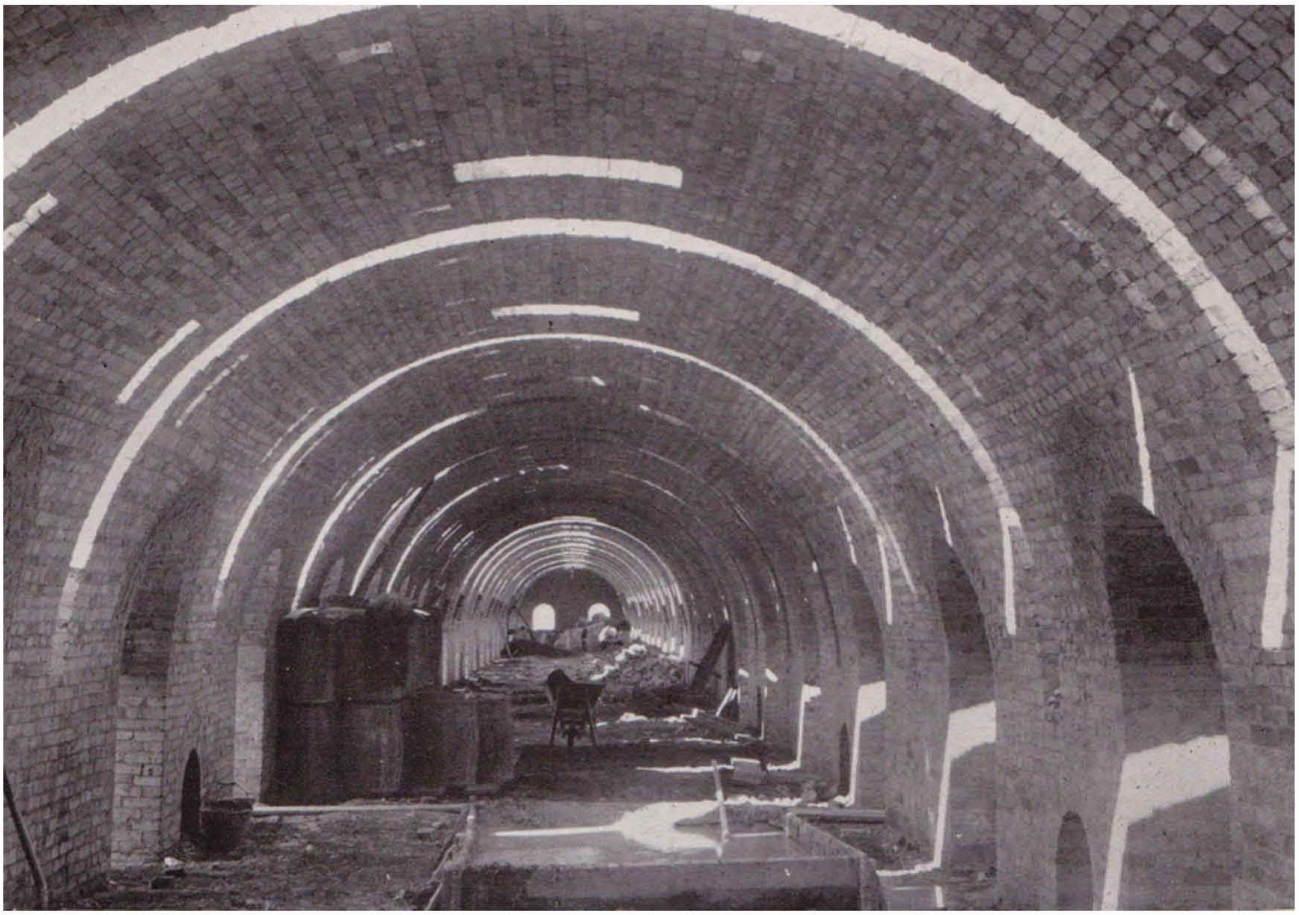
November 9, 1914

Advanced State of Pier Construction

These impressive structures were earth-filled, however, not solid brick, which may be part of the reason they have all disappeared without a trace as the brick exterior was cannibalized.

November 19, 1914

Showing the main arch and 27 completed doorway (side) arches. Note the Zanesville and Western Railroad along the hillside to the right, leading westerly to the Congo Tunnel.



November 24, 1914

An impressive interior view of the main arch. Doorway arches an be seen on either side as well as the interior end of the dampers.

November 31, 1914

Showing the waste heat duct along the top of the kiln and the small damper openings or smoke ducts between the arches. Looking northwest.

December 3, 1914

The starting end of the kiln with the end wall built to a height of nine feet. Note the two underground ducts in the foreground. The right hand duct leads to the fan which furnishes draft for the kiln. The left hand duct leads to the fan which draws off the waste heat from the kiln and forces it into the dryer.

December 8, 1914

Showing the waste heat flue on the right, which is connected to an opening in the top of the kiln every twelve feet and carries heat from the cooling brick in each chamber to the waste heat dryer for green brick. On the left are brick piers to support the kiln roof shown under construction in the background.

December 11, 1914

Showing the unfinished waste heat dryer. Looking west

December 15, 1914

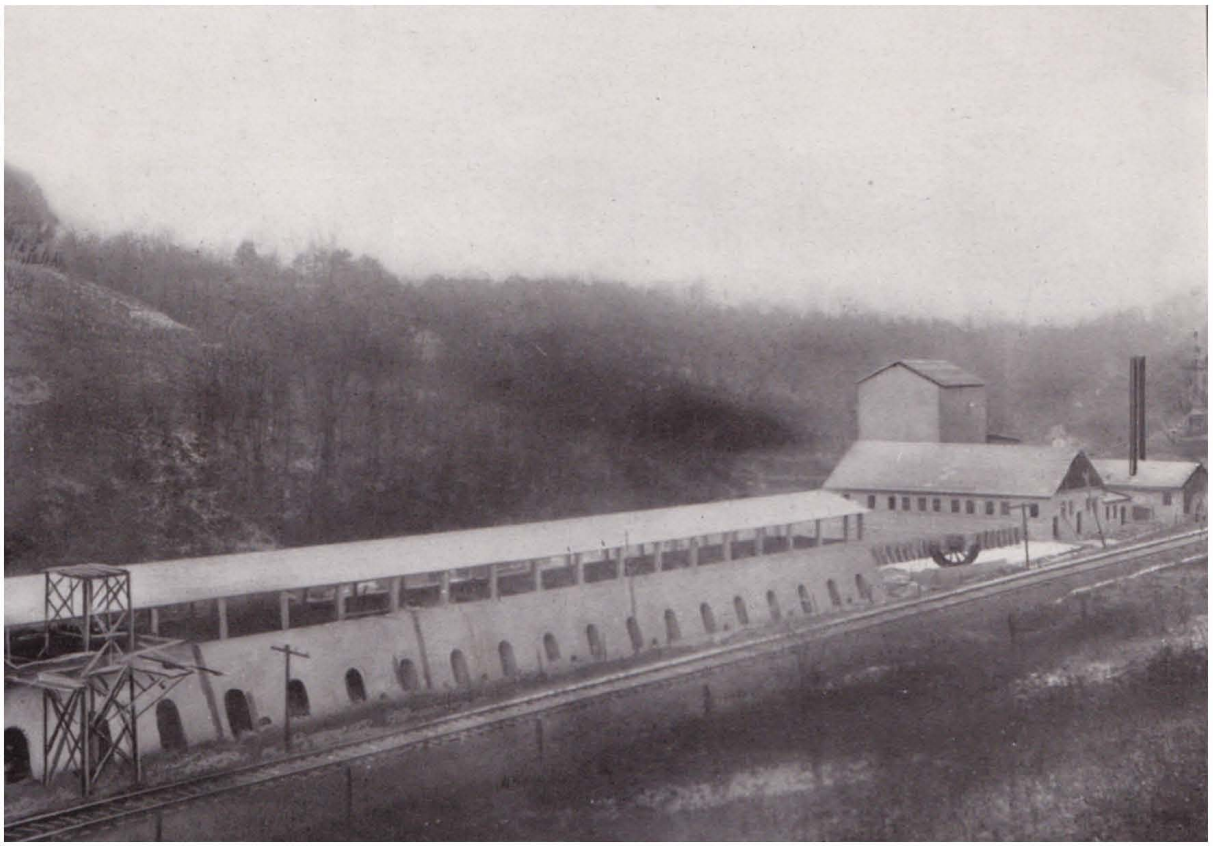
Showing the top firing holes through which the coal is loaded and the gauge holes for measuring ware shrinkage during the burning. The waste heat opening is also shown at right. When complete the top of the kiln will be covered with earth, level with the piers, making a smooth pavement level with the castings covering the firing holes.

December 22, 1914

Showing the tapering drop arches placed in the center of each chamber. These prevent cold air from passing over the top of the brick too rapidly. The bricks on the kiln floor were hauled in from the weather to keep them dry and protect them from frost.

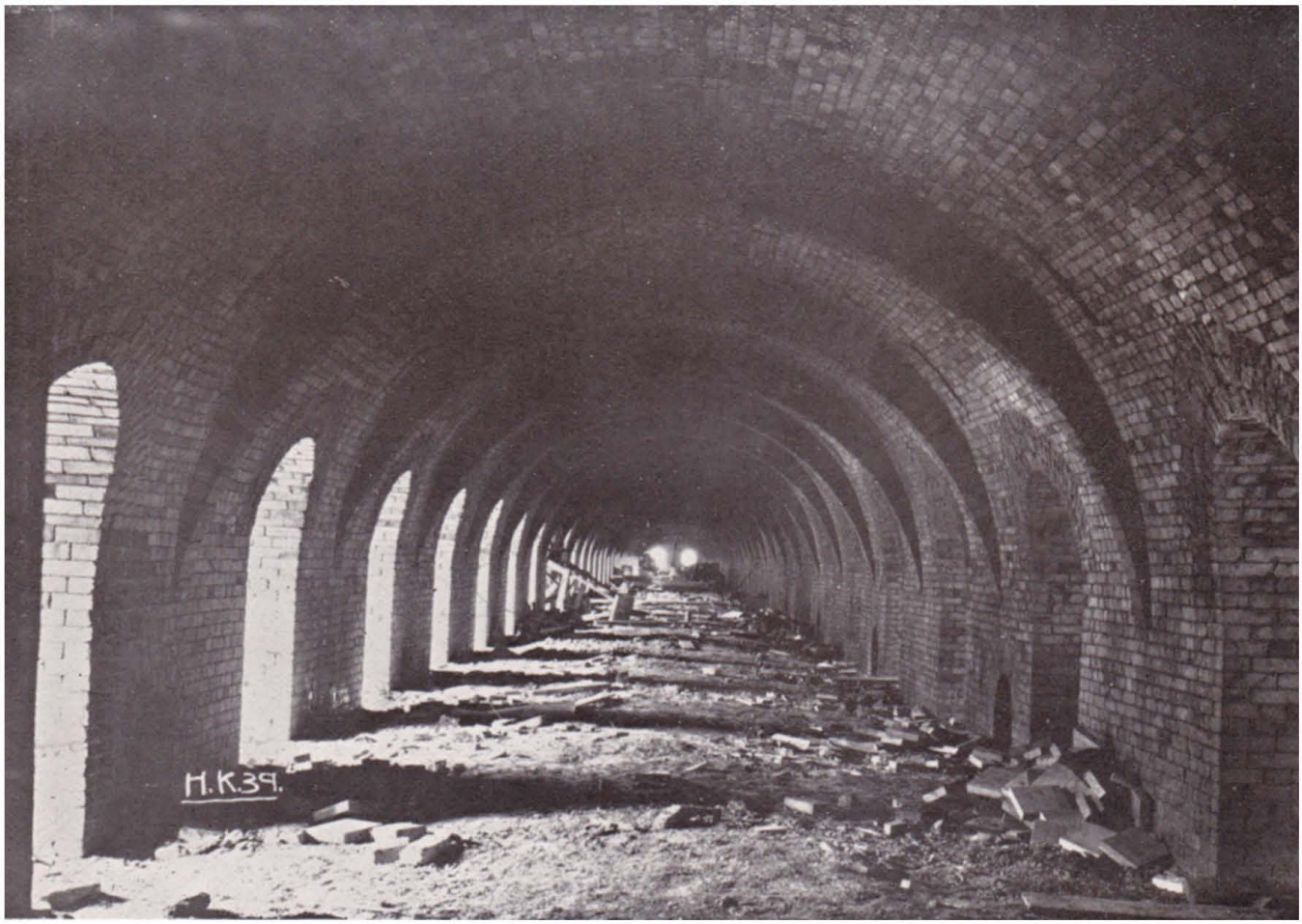
December 28, 1914

The kiln shed under construction. Kiln doorways and smoke flues are shown. These doorways will be used to empty the kiln while those on the opposite side will be used for loading. The doorways are then bricked shut before firing.



December 28, 1914

Part of the kiln roof constructed but without side sheds. The tunnel waste heat dryer is nearly completed and the machine house is nearing completion. "In the hills which are seen back of the plant, there is material for hundreds of millions of the best paving block. The shale bank back of the kiln is 200 feet high and is connected by track to the grinding room."

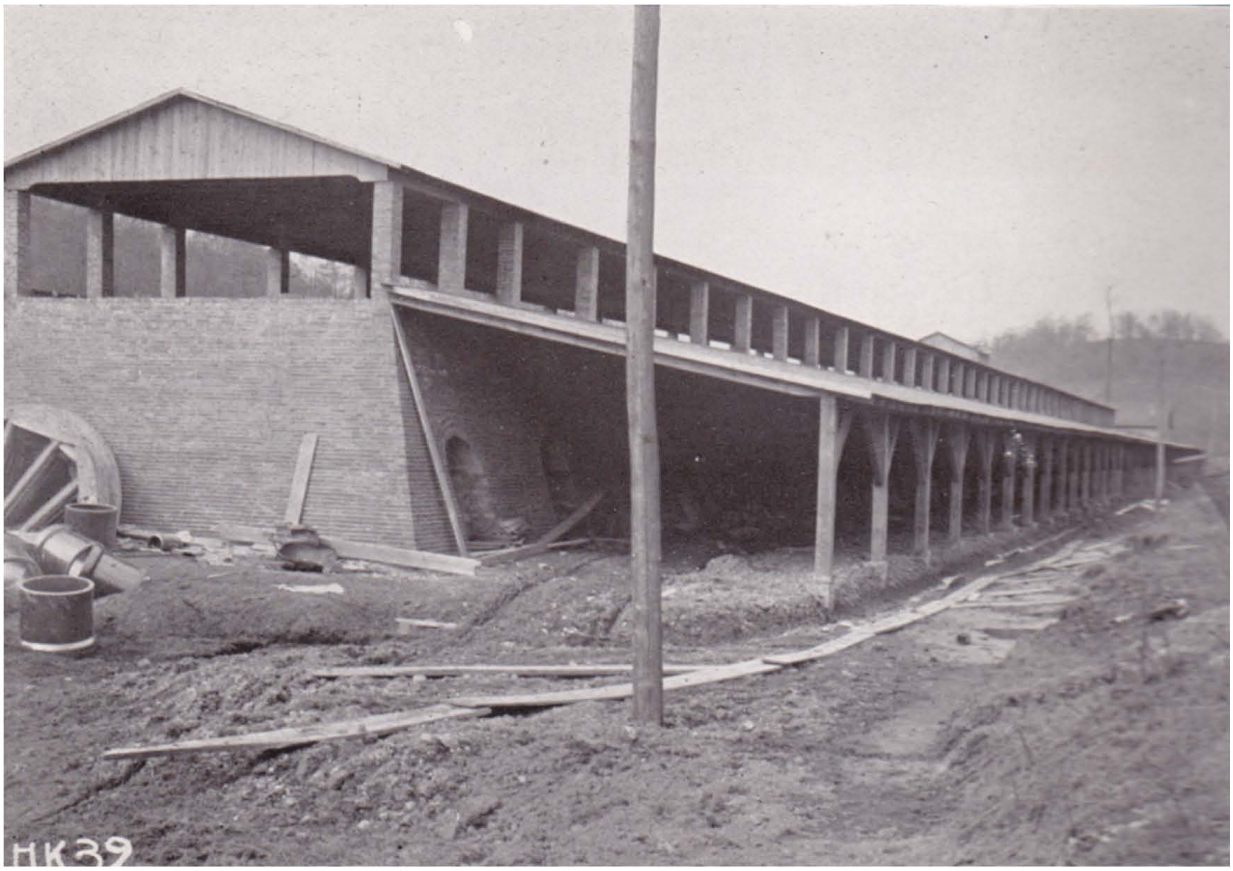


January 12, 1915

Completed chamber showing drop arches from which paper partitions are hung to control the advancing heat. Each chamber is 12 feet long and 15 feet across at ground level.

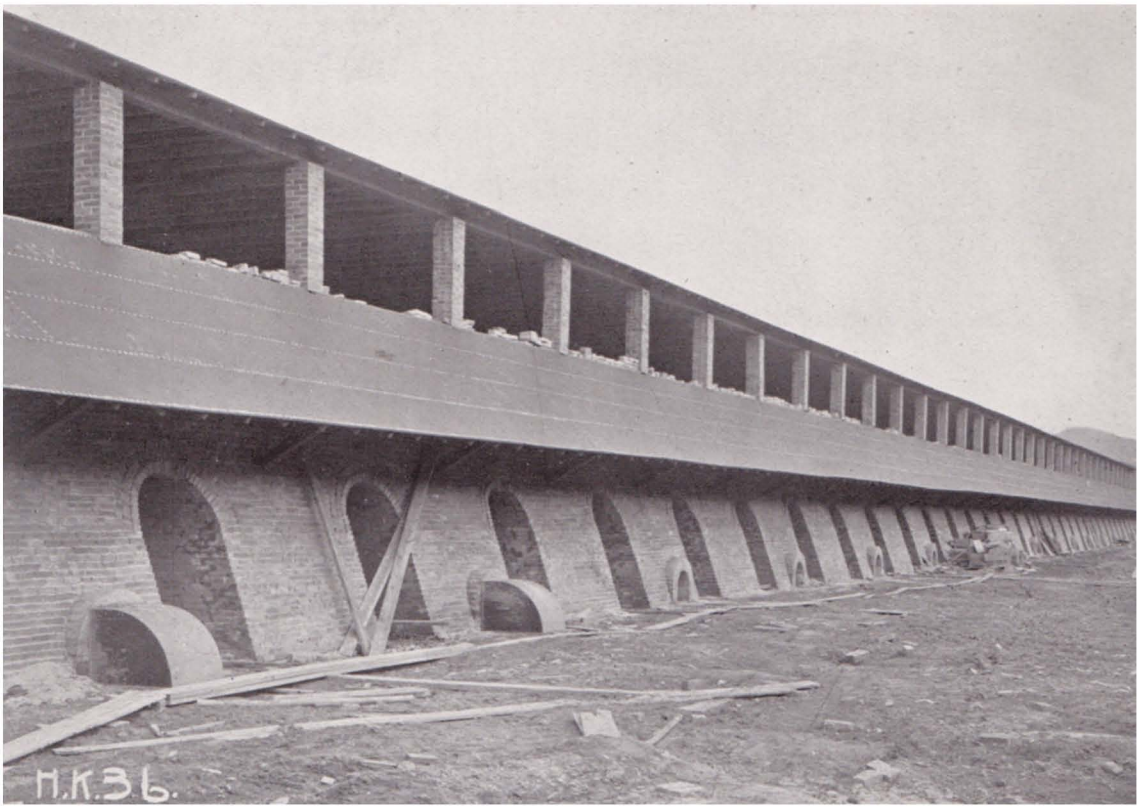
January 24, 1915

Earth filling on top of the kiln with feed holes and gauge holes also shown.



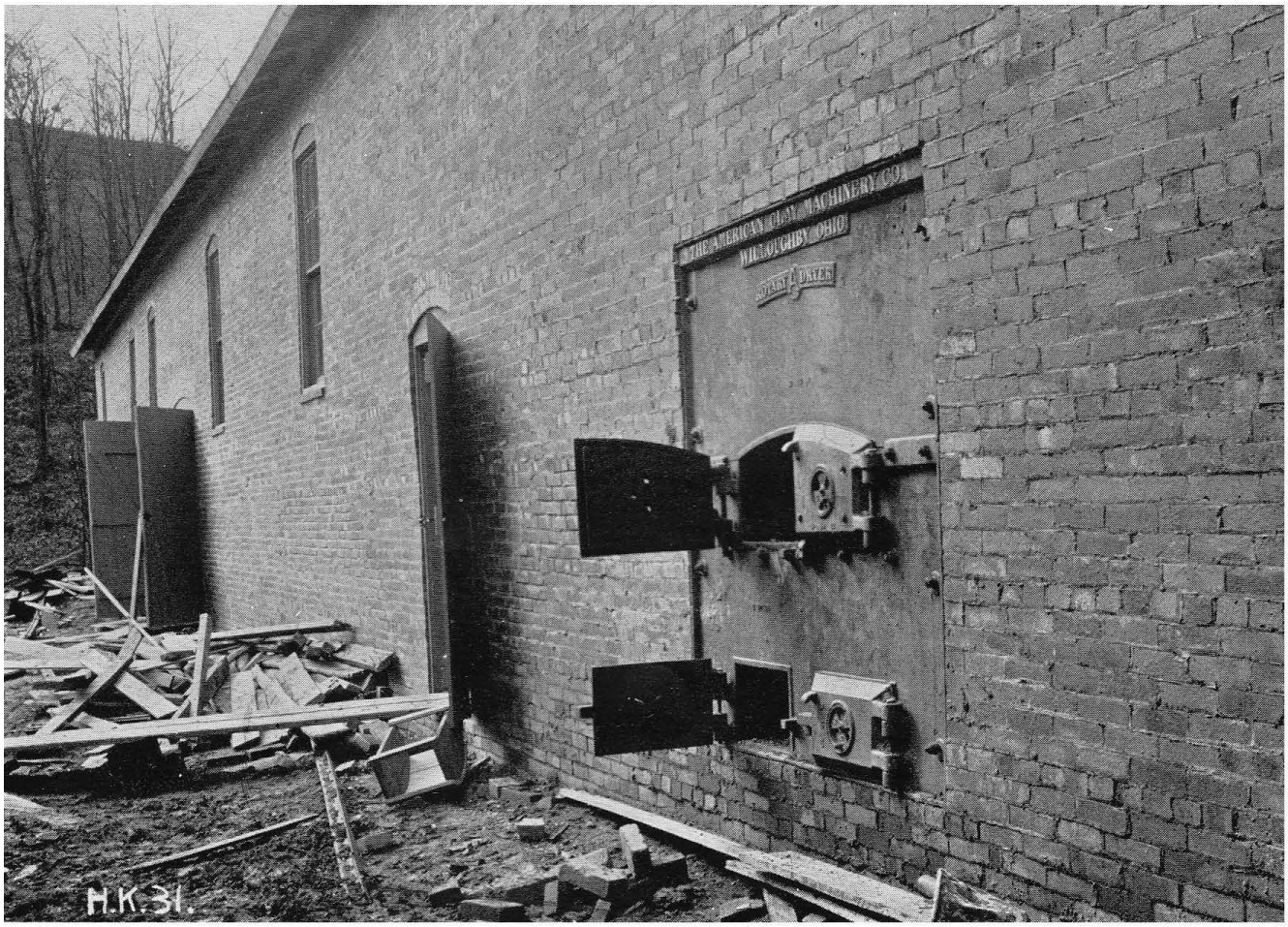
February 14, 1915

Finishing end of kiln with kiln roof and side shed completed. The side shed extends twenty feet from the kiln to cover green brick and the transfer track.



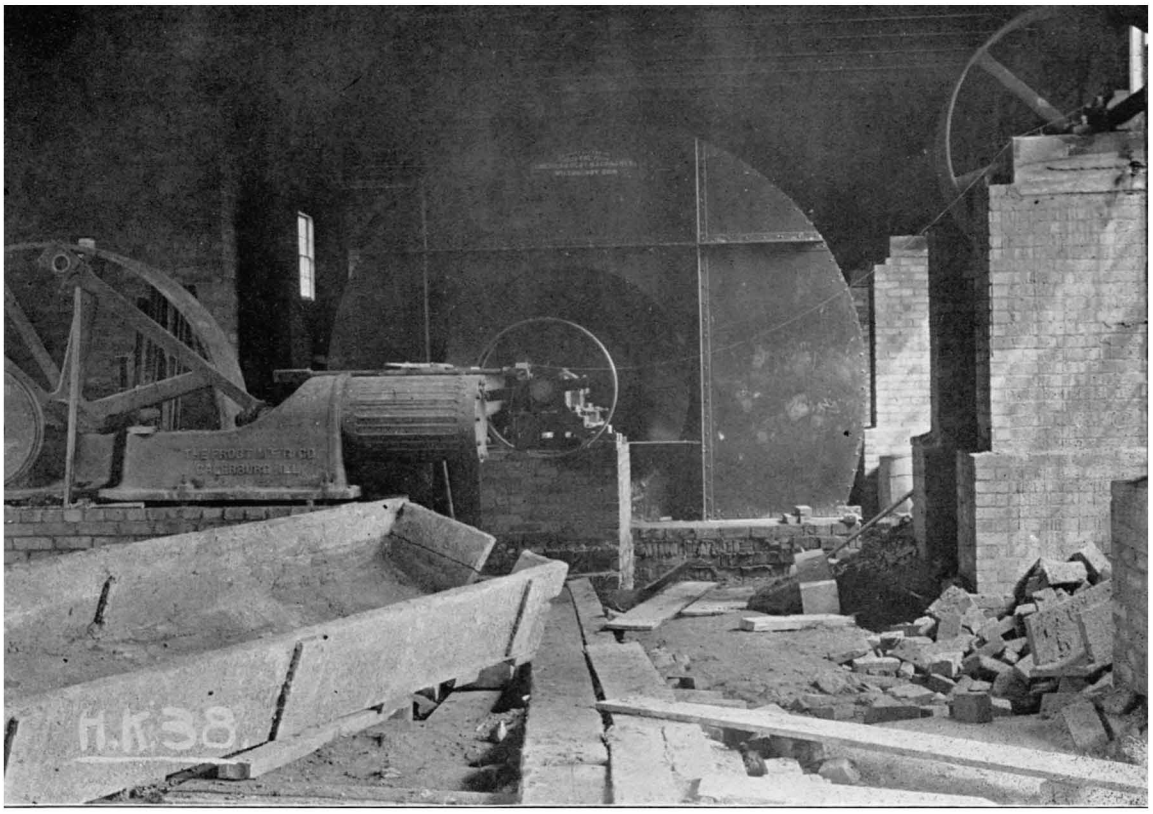
February 14, 1915

The west side of the kiln with roof completed. Side shed protects the wickets and doorways from the weather. Note the steel hoods set against the damper openings in the kiln wall. These connect the kiln chamber to the flue leading to the fan which produces the necessary draft.



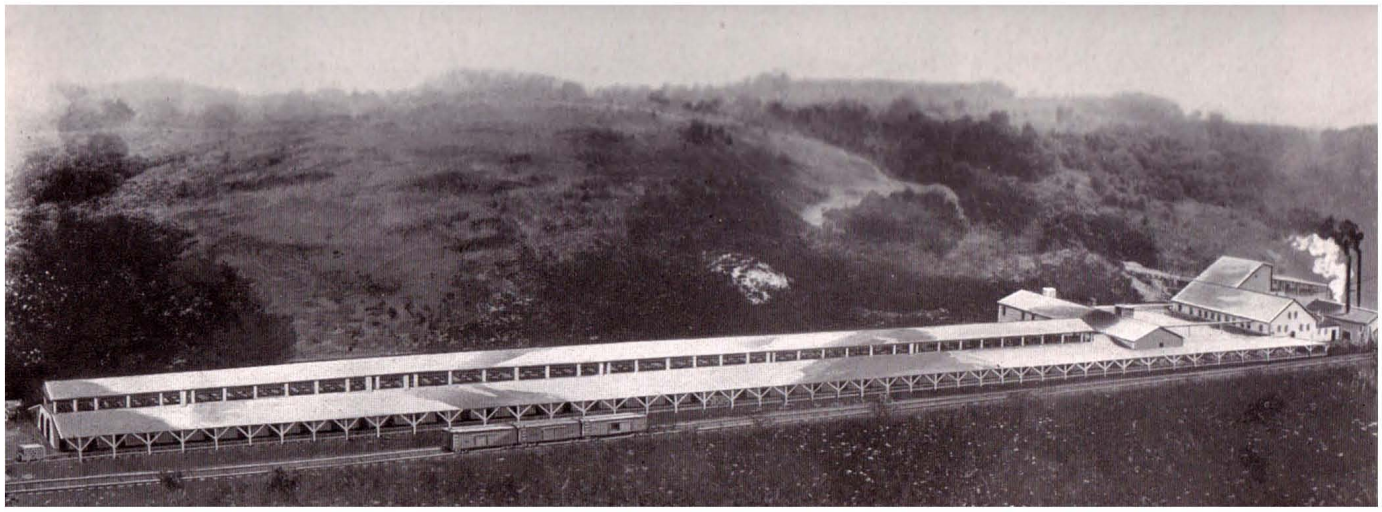
February 28, 1915

Auxiliary furnace set in the wall of the fan house. This furnace creates the heat needed to start the dryer before the waste heat from the kiln is available.



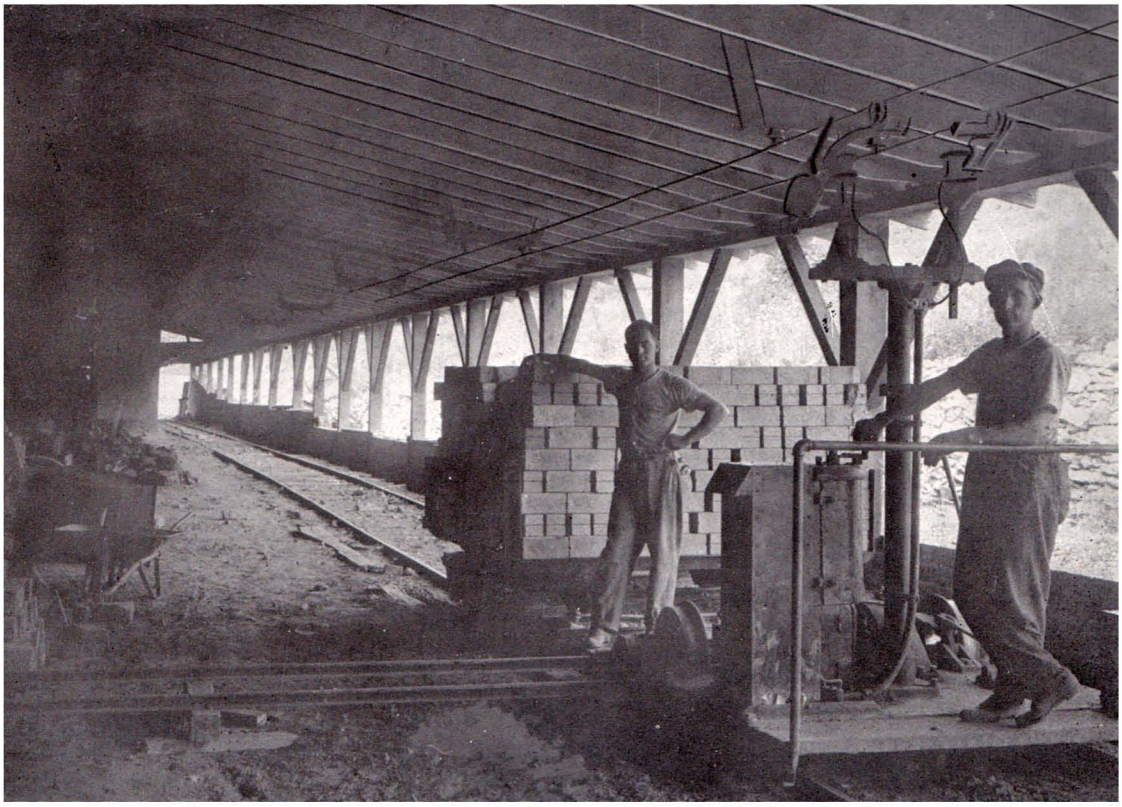
March 11, 1915

Inside of the fan house. The three-quarter housed exhauster shown was built at the Willoughby plant. It is directly connected to the engine and furnishes draft for the continuous kiln. A second fan draws waste heat from the cooling kiln and forces it into the dryer.



The completed kiln, looking west. Shale pit shown in the back right. According to Ben Altier, this has always been referred to as the "shale bank."

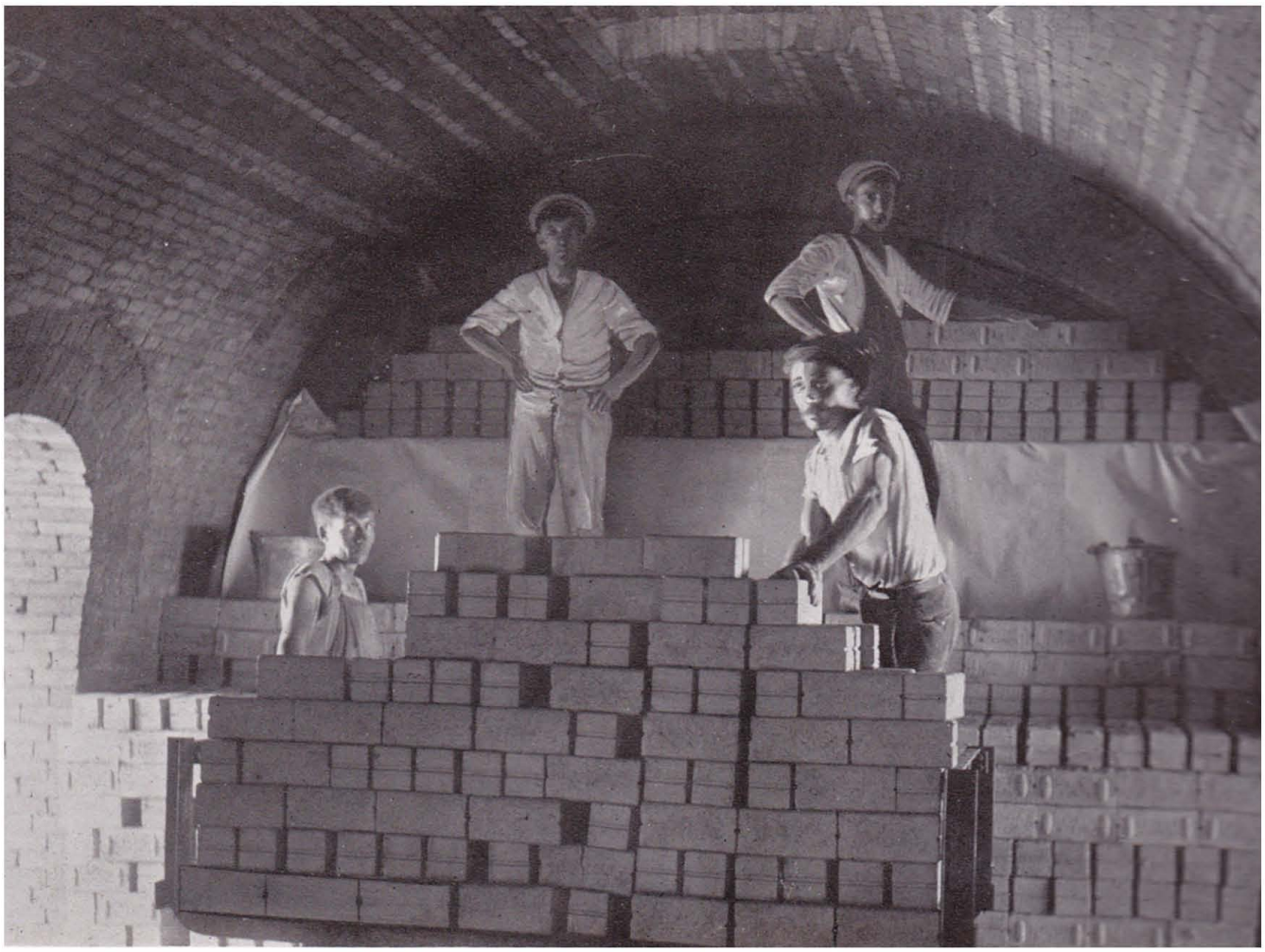
The Lincoln Paving Brick Co. booklet next showed a series of photographs illustrating how the kiln worked. For the sake of completeness, these are included here.



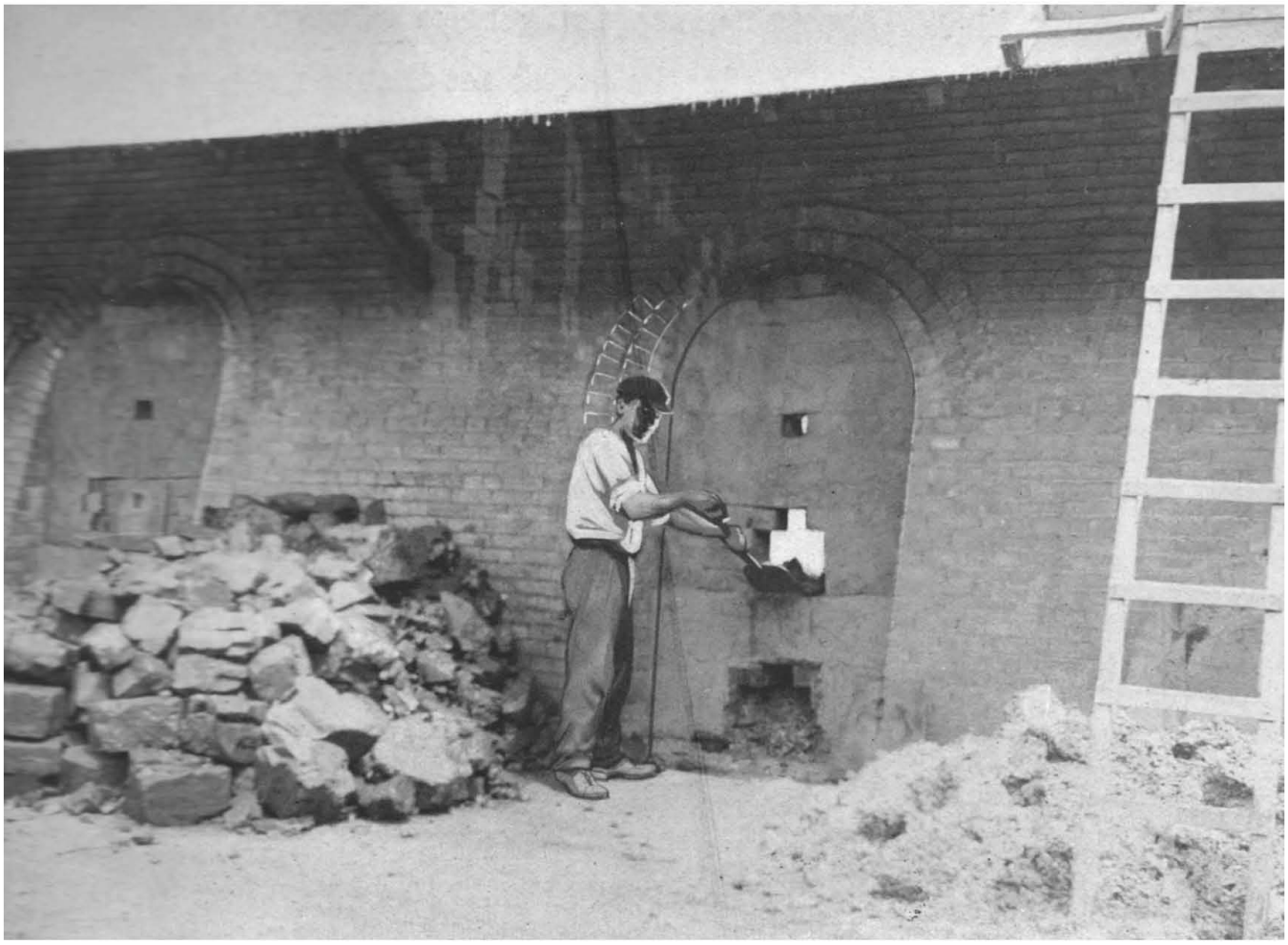
A car of green block waiting to be placed in the dryer. The dryer consists of 24 tunnels having a single track in each tunnel and is equipped with 400 single deck cars. The waste heat is drawn off the cooling compartments of the continuous kiln through underground ducts and forced into the dryer by an American No. 260 Steel Plate Exhauster with 13 foot diameter fan wheel.

Dried block on the cooling track outside the dryer. These were all dried with waste heat from the Haigh kiln, in an American Waste Heat Dryer. Hadfield-Penfield would advertise this as the "American Line."

Cars of block placed on the electric transfer car which takes the block from the dryer to the kiln and places them opposite the doorway of the chamber, where they are then set in the kiln by hand, a major disadvantage of the stationary or "moving fire" type of kiln.

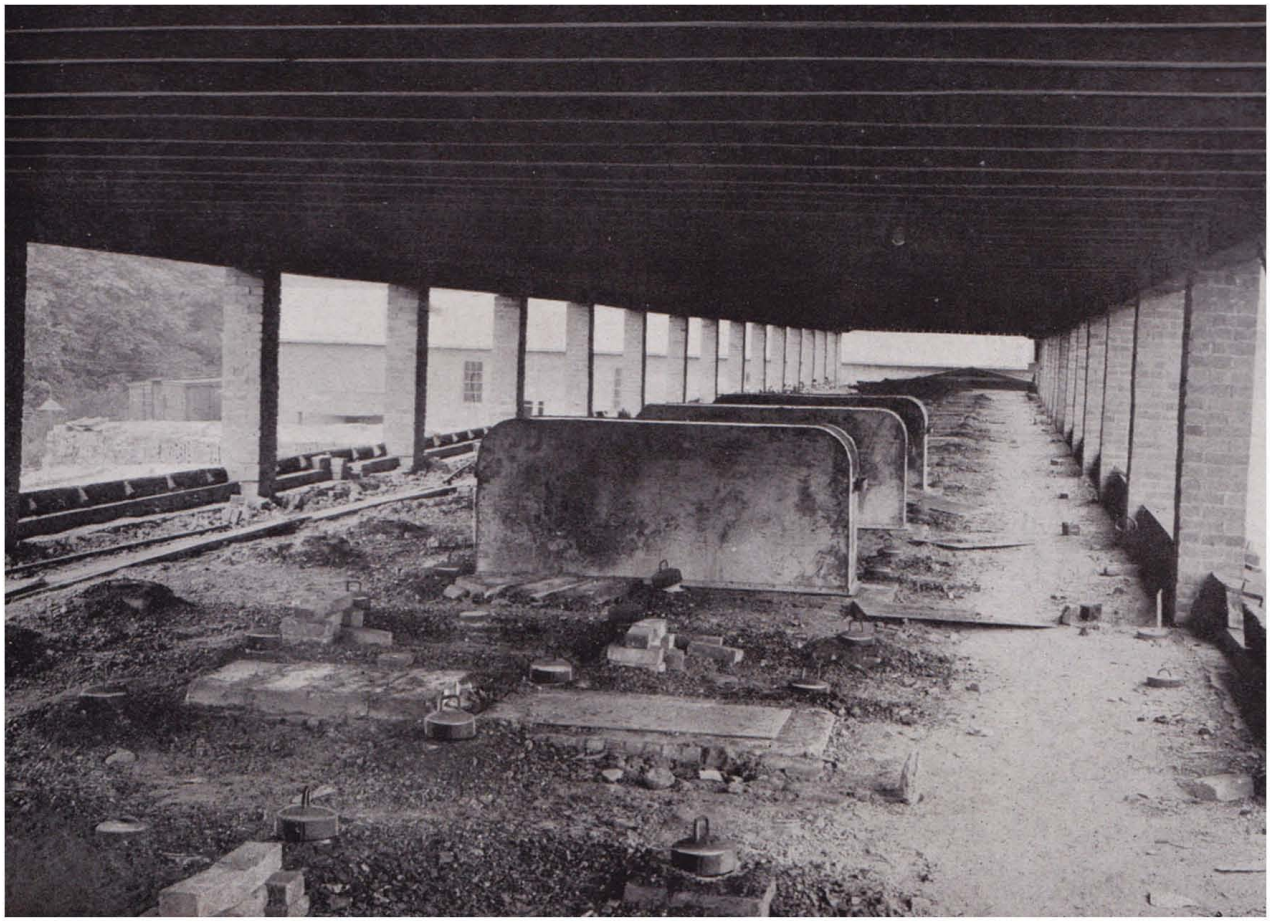


"Setters" removing block from the transfer cars in the kiln chamber and stacking them. The paper partition is placed between every chamber to prevent back draft. (Ordinary newsprint is used.)



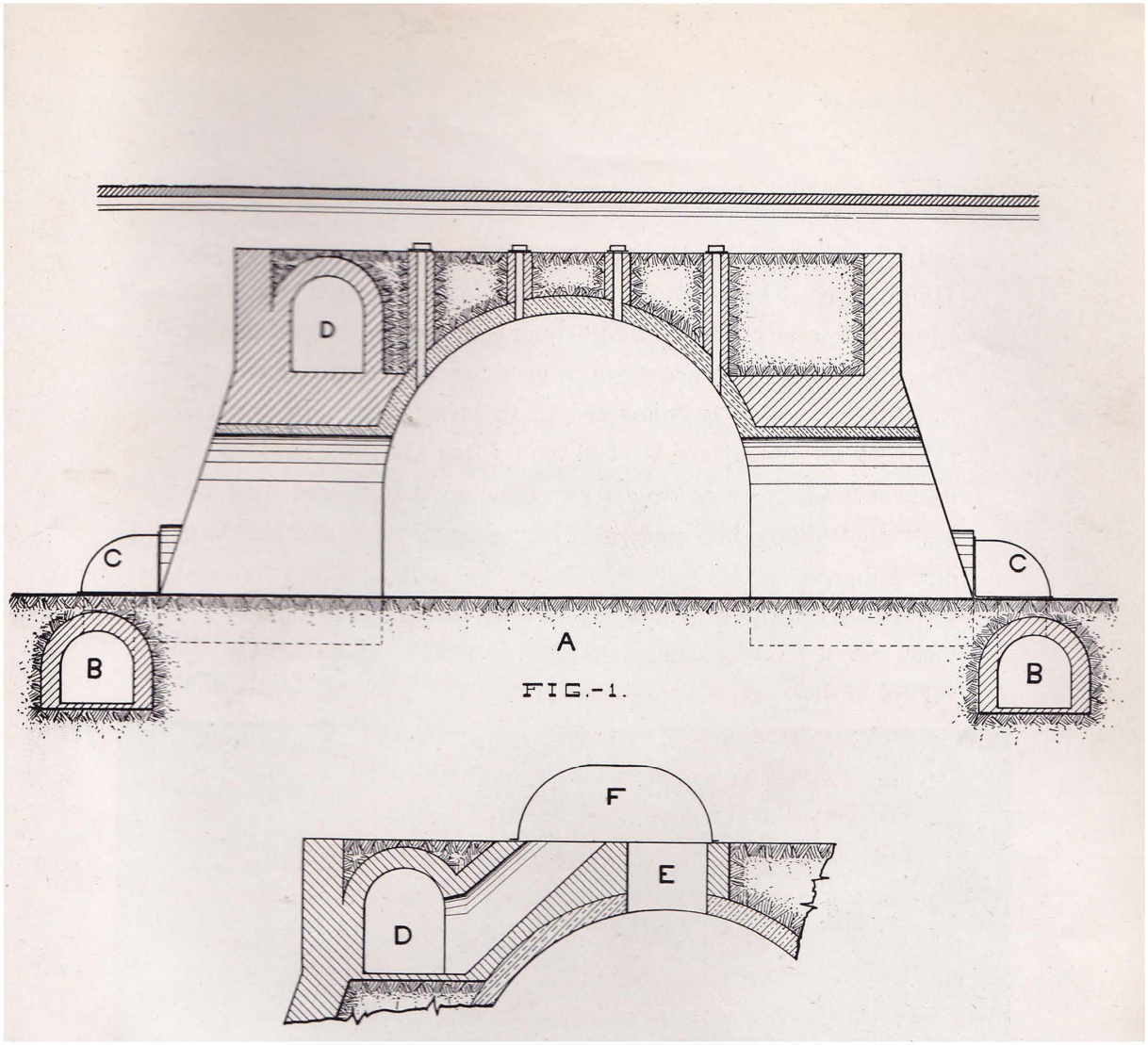
Side-firing showing an open wicket built in the bricked-up doorway. The wicket in the doorway on the left has already been closed. After firing, the waste heat is withdrawn, the doorway is opened, and the finished paving block removed.

Only a small amount of coal is used for the top firing. The firing holes are placed every four feet lengthwise and crosswise in the kiln. The bunkers are moved along the kiln as the fire advances. When the kiln is at maximum heat, the coal is almost completely gasified before it reaches the floor of the kiln. No grate is required in either the side- or the top-firing.



Waste heat hoods placed in position on the top of the kiln. The hood connects the opening in the top of the kiln (p. 35) to the opening in the duct leading to the dryer. All the heat required for drying the block in the waste heat dryer is obtained from the cooling block in the kiln.

Block being wheeled out of the kiln. These are taken out the side opposite from where the green block entered the kiln, so there is no confusion between the setters and the brick wheelers. Two chambers are generally being emptied at one time, leaving one chamber empty between the loaders and the setters. Although not used at this plant, conveyers can sometimes be used to transfer block from the kiln to the freight cars.



Cross-sectional diagram showing draft flues (B) and connections through the kiln wall to the chambers via sheet steel hoods (C), also the crown opening (E) connected to the waste heat duct (D) by iron hoods (F)

Competition

The first working American tunnel kiln was built by James C. Anderson of Highland Park, Illinois, in 1889. Anderson patented a twin tunnel type of kiln, using wooden railroad flat cars to carry the ware (Kier 1922: 604; *Brick and Clay Record* 66(1): 23). More successful were two Faugeron (also known as Didier-March) type continuous kilns built in 1910 at Keasby, New Jersey; these operated successfully for at least eight years. These, as well as the popular Harrop kiln patented by Ohio State University ceramic engineer Carl Harrop in 1918, were still direct-firing, although Harrop later incorporated baffles. Introduction of the Dressler method of muffled firing, in which combustion gases do not come into direct contact with the ware, revolutionized the industry, although it was also adapted to direct firing. By 1922 it was the most common kiln type in operation in the United States. A 1922 advertisement boasted that forty Dressler kilns

were successfully firing 24 different products, and a 1925 survey shows almost two-thirds of the operating kilns were either Harrop or Dressler kilns and for brick production the Dressler kiln was outpacing the Harrop by about three to one (*Brick and Clay Record* 66(1): 300-33). (The Harrop kiln was better adapted to finer ceramics, particularly white ware.)

While these developments may have occurred subsequent to the demise of the Lincoln Paving Brick Co., they undoubtedly had a profound effect upon the end of the Haigh stationary kiln. It would in fact be very interesting to know just when the last Haigh kiln was built. Hadfield-Penfield was still advertising Haigh kilns in 1923, claiming that a Haigh kiln saved half the coal and half the labor of conventional kilns (*The Clay-Worker* 80(1): 175); but the company clearly was putting greater emphasis on its other equipment, particularly its No. 384 clay and shale grinders, billed as a "producer and saver." Although it

continued to advertise a variety of its heavy equipment for a number of years to come, none for the Haigh kiln have been found after August 1923. Curiously, one of the last (*The Clay-Worker* 79(7): 697) economically used photographs of the possibly defunct Lincoln Paving Brick Co. kiln in an advertisement touting the "Columbus (Ohio) Haigh Kiln at the plant of The Shale Brick Co." The company's display at the Seventh Annual meeting of the Common Brick Manufacturers' Association (1925) did include what look like new photographs of a different Haigh kiln, as well as photos of their No. 384 grinder, so the company was apparently still marketing the Haigh kiln at that time (*The Clay-Worker* 83(2): 160). The same display was described in more detail in *The Clay-Worker's* account of the 39th annual convention of the National Brick Manufacturers' Association held just a few weeks earlier (83(2): 139). "As usual," the largest delegation of "live wires" was from the Hadfield-Penfield Co., including president L. W. Penfield and Lambert

Haigh, acknowledged to be the "cribbage king" of the convention. (R. C. Penfield was also present, representing the New York Brick Handling Corp.).

As early as 1922, Williams (*The Clay-Worker* 77(1): 34-34) could aver that "Probably the moving fire type of the tunnel kiln, is cheaper than any of the others to build, and it is also probably true, that the compartment type of the moving fire type is the most expensive to build… [and] to maintain." Further, "while this type of a kiln was a good kiln in its day, yet the successful use of the moving ware kin has to a large extent relegated the former (moving fire kiln) to the discard … All other conditions being equal, a moving ware or car kiln, will take about ten to fifteen per cent coal less, than will one of the moving fire type. "

By 1924 a general study on Michigan clays and shales (Brown 1924: 178) could state flatly that "The continuous car tunnel kiln is the ideal

type for all purposes... Compared to the continuous chamber kilns [such as the Haigh kiln] the car tunnel offers advantage in less handling of the ware and usually less kiln repair..." Even more blunt was an unsigned article in the June, 1924, *The Clay-Worker* (81(7):678-679): "...during the next five years the general brick and tile-making people will, as a matter of self preservation, have to come to the moving ware type of kilns, burning small-sized units."

Rather than pursue the possibilities of the moving "railroad" car tunnel kiln, however, the Hadfield-Penfield company appears to have concentrated on ways to make the transfer of clay products to and from the stationary kiln more efficient. At least Raymond C. Penfield did, presenting several papers on such topics (e.g., Penfield 1922, 1923). In 1923 Penfield patented both an "Apparatus for Unloading Kilns by Hopper" (U. S. Patent 1,444,206) and an

"Apparatus for Unloading Kilns by Conveyer" (U. S. Patent 1,444,207). However effective these improvements may have been, they did not manage to compensate for the advantages of the continuous car tunnel kiln.

Lambert High

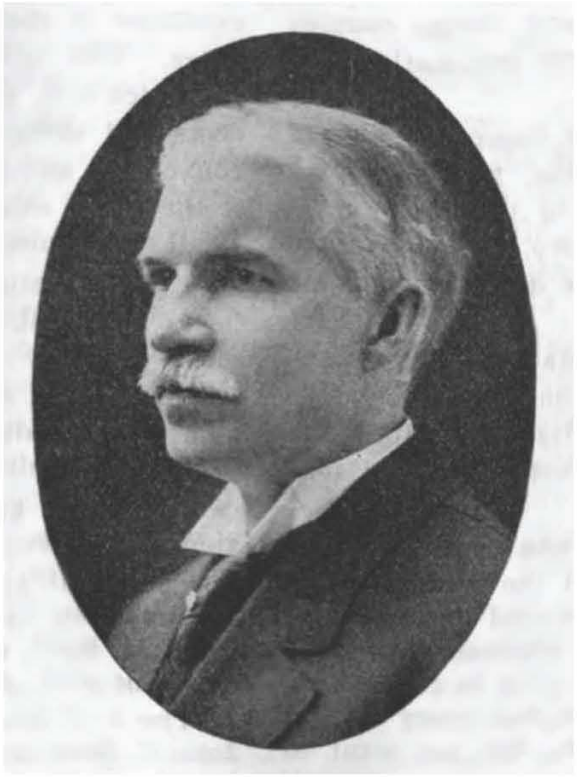
Lambert Haigh at his Desk, April 1915

In the 1920s Lambert Haigh continued to work for the Hadfield-Penfield Co., which had been formed after the U. S. Army Bureau of Ordnance designated it a sub-licensee in 1917 to produce armor-piercing shells according to the Hadfield system. (Sir Robert A. Hadfield was the British discoverer and developer of manganese steel alloy.) *The Clay-Worker* (68(6): 569) reported that the American Clay Machinery Co. had recently obtained a government contract for 500,000 six-inch shells and would equip a new department for their manufacture. As the Penfield family later explained it, the company overexpanded to fulfill such government contracts and when the government contracts were quite suddenly cut off the business slowly went downhill (Kingsley 1981: 76).

The Hadfield-Penfield Company had been formed with the agreement of R. C. Penfield in late 1919, Penfield retaining 60 per cent of the new company and Hadfield buying the rest.

The company directors chose the Bucyrus plant to manufacture manganese steel while the Willoughby Penfield plant was to continue production of traditional Penfield castings. In 1927, L W. Penfield, R. C.'s cousin, who had long worked for the company, was listed as director and vice-president of the American Clay Machinery Co. and resident manager of the Willoughby plant of the Hadfield-Penfield Steel Co. (Cleveland Topics Co.: 283-284).

Unfortunately for the firm, the end of World War I diminished the demand for armor-piercing shells, at least for a while. The company, with factories in both Willoughby and Bucyrus, continued to manufacture clay making machines as well as tractors, graders, industrial locomotives, and other steel and gray iron castings, but the unanticipated lack of demand for armor-piercing shells during the period between World Wars I and II, coupled with the inexperience of the American workers with the Hadfield technology, proved to be a real



L. W. Penfield 1925
(The Clay-Worker)

disaster for the company, which closed in 1927 (Tweedale 1987: 121-127). There had been some subtle indications that the company might be in trouble: habitually placing two and even three and four page advertisements in *The Clay-Worker* for years, by the end of 1926 these were reduced to single page advertisements (none, by the way, mentioning the Haigh kiln).

In its last few years, while Lewis W. Penfield remained vice-president of the company, first E. H. Haslam and then W. A. Riddell served as president. No great surprise then to find Lambert Haigh continuing to work as a salesman for the W. A. Riddell Co., which took over Hadfield-Penfield in 1927. (Production ended at the Willoughby plant at that time.) The W. A. Riddell Corporation, soon known as WARCO, dated back to 1854 and would continue to produce graders and other large earth-moving equipment for many more years before being eventually being acquired by the Huber Manufacturing Co. in 1957 (Haddock 2002: 151). *The Clay-Worker* (88(1):60) reported that Riddell served as receiver for a year before purchasing the company at the June 9 sale. It was expected that the Bucyrus plant would operate "along the same lines." Only a month before the sale (*Ibid.* 87(6): 484), R. C. Penfield and his New York Brick Handling Co. had moved offices from 110 East 42nd St. to Room 2345 in the new Graybar Building.

The Penfield family always maintained that L. W. carried the failure and closing of the Willoughby plant to his grave (Kingsley: 76). Almost as a coda if not a eulogy, George M. Fiske's authoritative *The Evolution of Brick and Brickmaking in the United States,* published in installments in *The Clay-Worker,* devoted Chapter XV (*The Clay-Worker* 88(5): 365-367, 403-404) to a history of J. W. Penfield and the development of the American Clay Machinery Co. The following April, Fiske used his Chapter XVIII to describe "The Mechanical Handling of Brick" (*Ibid.* 89(5): 388-392), largely an account of R. C. Penfield's Chicago experimentation and development of the application of brick lifts/cranes to the entire brick-making process: "Sufficient to say ... that the application of the Fiske and Francis and Penfield patents in the hands of Mr. Penfield has brought about a revolution in the entire common brick business of Chicago and vicinity." In June, 1928, Fiske's Chapter XX (*Ibid.* 89(7): 562-564) described

"Mechanical Brick Handling: The Penfield System." Regrettably, space in *The Clay-Worker* seems to have become a premium at this point and while the editor repeatedly promised that more detail would be provided when "the book" was published, "the book" never seems to have appeared, and Fiske's chapters ended with the next issue's "Brick Plant Engineering," which dealt largely with the development of dryers and not addressing the history of kilns.

It is pleasant to think that L. W. Penfield saw Fiske's encomium before his death, which occurred at Willoughby, July 29, 1929, though it might not have assuaged his sense of failure; likewise his cousin R. C. Penfield, who died in New York City on July 11, 1932 (*The Clay-Worker* 98(1): 26-27). Both men are buried in Willoughby.

Lambert Haigh, who spent most of his life in Bucyrus seems to have last visited England in 1920 (*Brick & Clay Record* 56(1): 1234). He

lived until 1940, though predeceased by all four of his brothers (Bucyrus *Telegraph-Forum*, February 15, 1940). Hervey Haigh of Wesley House, Linthwaite, Yorkshire, had last visited the United States in 1913 and died October 9, 1930 (Principal Probate Registry. Calendar of the Grants of Probate and Letters of Administration, Probate Registries of the High Court of JustIce, London, England, probated April 1, 1931), although his widow, Susie Sykes Haigh, lived until 1954.

Conclusion

To return to the Lincoln Paving Brick Co., we can speculate that its demise was due to a number of factors. Nationally, the output of brick and tile rose 32 per cent in the first decade of the 20th Century but then declined by 38 per cent between 1909 and 1919 (Fabricant 1940: 243). Production would rebound in the following decade but too late to help the Lincoln

Paving Brick Co. It may be significant that the nearby paving brick plants at Glouster and Trimble went into receivership in 1918, although they were later sold and continued production for another decade or more. The Columbus Brick and Terra Cotta Co. at Union Furnace ended in 1921, and the Athens brick plant was dismantled in 1922.

Also important was the fact that the Corning company was focused upon a single product—paving brick—more or less riding the wave of highway construction during the first quarter of the 20th Century. Although the Haigh kiln could be used to produce quite a variety of refractory products, there is no evidence that the Lincoln Paving Brick Co. ever attempted to diversify.

A third factor may have been the limitations of available raw material and problems with grinding and firing the raw material. It appears

from the geologic map accompany Flint's (1951) study on the geology of Perry County, that the plant at Corning probably utilized shales belonging to the lower Conemaugh Group, lying below the Brush Creek limestone, rather than the shales between the Brush Creek and overlying Portersville limestone, the horizon utilized elsewhere in the region, as at Glouster and Trimble. Because the exact location of the raw material utilized at this plant remains unrecorded, it is possible that the higher shales were utilized, but this is unlikely due to the added expense of transportation. Regardless, bricks from the Corning site are rather poor quality pavers containing rock particles, with spalling and cracking. It may be argued that only cull specimens remain at the plant site but the defects seem too common to be explained away in this manner. The incipient cracks may be due to over-firing, while the spalling is partly due to poor grinding and mixing that permitted the inclusion of large particles of shale or detritus.

Lincoln Block with Large Inclusion and Spalling

Side View with Spalling, Crack, and Inclusions

Nor to be overlooked is the fact that Haigh kilns were expensive to build. Savings came largely in fuel reduction costs and reduction in losses due to uneven firing, but these benefits would accrue only over a relatively long period of time, a commodity that proved unavailable to the Corning company. Still another factor and possibly the coup de grace was the rapid adoption of single-chamber "railroad" tunnel kilns, although other brick works continued to operate for decades with the familiar round, down-draft "bee-hive" kilns and at some profit.

The 1923 fire at "the plant of the Consolidated Clay Products Co., at Corning, O." undoubtedly was a blow to the company. Presumably the damage was repaired but there currently is no evidence that it was or that the plant continued production. It is very probable that the plant was repaired, for the plant was later described as being in excellent condition when the receivers, E. A. McCuskey and C. W.

Naas, offered it for sale (Portsmouth *Daily Times*, April 24, May 8, 1928). According to Ben Altier (pers. comm.), the property was then purchased by the Sunday Creek Coal Co.,

The Site Today, looking Northwesterly

which used the site to story mining equipment, and more recently by the Altier Brothers Co.

to store oil drilling equipment. Today there is virtually no evidence of the brickyard, even most of the bricks scattered over the area having been brought in. Some "Trimble" and "Wassall" paving blocks were noted but most are unmarked building brick. It was first thought that the concrete footers currently used to store oil pipe were derived from the supports for the kiln shed (compare pages 41 and 73) but Mr. Altier states that these were actually brought to the site much later.

Because the Lincoln Paving Brick Co. may have operated for little more than a decade (1915-1923/1928) and sporadically at that, it should not be surprising that marked examples of the pavers are relatively rare. Yet, there is a certain historic irony in the fact that construction of the Lincoln Paving Brick Co. was so thoroughly documented while the product is so seldom seen today and the company so little known.

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